PHOTOCHEMISTRY AND PHOTOBIOLOGY

VOLUME 59 ISSUE 1 JANUARY 1994

Contents

Editor's Comments	i	
Instructions for Authors	iii	
SI Units	iv	
In Memoriam	vii	
Rapid Communication		
Beth Anne Jurkiewicz and Garry R. Buettner	1	Ultraviolet light-induced free radical formation in skin: an electron paramagnetic resonance study
Articles		
Colin F. Chignell, Ann G. Motten, Robert H. Sik, Carol E. Parker and Krzysztof Reszka	5	A spin trapping study of the photochemistry of 5,5-dimethyl-1-pyrroline *N*-oxide (DMPO)
A. V. Novikov	12	Laser-induced fluorescence line narrowing of native porphyrins in animal tissue
Joseph R. Lakowicz, Ignacy Gryczynski, Józef Kuśba, Wieslaw Wiczk, Henryk Szmacinski and Michael L. Johnson	16	Site-to-site diffusion in proteins as observed by energy transfer and frequency-domain fluorometry
M. V. Encinas, E. A. Lissi and J. Alvarez	30	Fluorescence quenching of pyrene derivatives by nitroxides in microheterogeneous systems
Jose V. Castell, Maria J. Gomez-Lechon, Carmina Grassa, Luis A. Martinez, Miguel A. Miranda and Pilar Tarrega	35	Photodynamic lipid peroxidation by the photosensitizing nonsteroidal antiinflammatory drugs suprofen and tiaprofenic acid
Velu Senthil, Linda Ramball Jones, Kannaki Senthil and Leonard I. Grossweiner	40	Hypericin photosensitization in aqueous model systems
M. Djavaheri-Mergny, M. T. Pieraggi, C. Mazière, R. Santus, A. Lageron, R. Salvayre, L. Dubertret and J. C. Mazière	48	Early alterations of actin in cultured human keratinocytes and fibroblasts exposed to long-wavelength radiations. Possible involvement in the UVA-induced perturbations of endocytotic processes
Mary Steidl Matsui, Nianci Wang, Deborah MacFarlane and Vincent A. DeLeo	53	Long-wave ultraviolet radiation induces protein kinase C in normal human keratinocytes
M. M. Sydenham, M. J. Collins and L. W. Hirst	58	The effectiveness of poly(allyl diglycol carbonate) (CR-39) for low-dose solar ultraviolet dosimetry
Maria M. Zuk, Boris D. Rihter, Malcolm E. Kenney, Michael A. J. Rodgers and Martha Kreimer-Birnbaum	66	Pharmacokinetic and tissue distribution studies of the photosensitizer *bis*(di-isobutyl octadecylsiloxy)silicon 2,3-naphthalocyanine (*iso*BOSINC) in normal and tumor-bearing rats
Rolf-Markus Szeimies, Tarek Sassy and Michael Landthaler	73	Penetration potency of topical applied δ-aminolevulinic acid for photodynamic therapy of basal cell carcinoma
Vitally Sineshchekov	77	Two spectroscopically and photochemically distinguishable phytochromes in etiolated seedlings of monocots and dicots
Shi-Mei Liu and Donat-P. Häder	86	Isolation and characterization of proteins from the putative photoreceptor for positive phototaxis in the dinoflagellate, *Peridinium gatunense* Nygaard
Nicolas Martens and Elizabeth A. H. Hall	91	Diaminodurene as a mediator of a photocurrent using intact cells of cyanobacteria
Richard G. Brereton, Ali Rahmani, Yi-zeng Liang and Olav M. Kvalheim	99	Investigation of the allomerization reaction of chlorophyll *a*: use of diode array HPLC, mass spectrometry and chemometric factor analysis for the detection of early products

Zhi-Chu Bi, Yue-Ying Qian, Xin-Li Zhao, Shu-Yin Shen, Jia-Yong Yu, Hui-Jun Xu and H. Ti Tien — 111 Photosensitization systems of covalently linked phthalocyanine complexes in both bilayer lipid membranes and tin oxide photovoltaic cell

Michitaka Kuki, Hiroyoshi Nagae, Richard J. Cogdell, Keizo Shimada and Yasushi Koyama — 116 Solvent effect on spheroidene in nonpolar and polar solutions and the environment of spheroidene in the light-harvesting complexes of *Rhodobacter sphaeroides* 2.4.1 as revealed by the energy of the $^1A_g^- \rightarrow {}^1B_u^+$ absorption and the frequencies of the vibronically coupled C=C stretching Raman lines in the $^1A_g^-$ and $2^1A_g^-$ states

Research Note

Victor I. Danilov, Oleg N. Slyusarchuk, James L. Alderfer, James J. P. Stewart and Patrik R. Callis — 125 A theoretical study of the cytosine excimer state: the role of geometry optimization

Technical Note

Jorge A. Escobar, Jeannette Vásquez-Vivar and Giuseppe Cilento — 130 Oxidation of indole-3-acetic acid by sonicated neutrophils. Pitfalls in correlating EPR signals and chemiluminescence

PHOTOCHEMISTRY AND PHOTOBIOLOGY

VOLUME 59 ISSUE 2 FEBRUARY 1994

Contents

Rapid Communication

G. Smith, W. G. McGimpsey, M. C. Lynch, I. E. Kochevar and R. W. Redmond — 135 An efficient oxygen independent two-photon photosensitization mechanism

Articles

L. T. van den Broeke, E. H. Ouijja, J. Bojarski and G. M. J. Beyersbergen van Henegouwen — 140 *In vitro* photodegradation of chlorpromazine

Kuo Chu Hwang, David Mauzerall, Richard W. Wagner and Jonathan S. Lindsey — 145 Synthesis of amphipathic porphyrins and their photoinduced electron transfer reactions at the lipid bilayer-water interface

A. D. S. Marques and G. S. S. Marques — 153 Spectroscopic studies of coumarin in micelles

M. Paardekooper, A. E. Van Gompel, H. J. G. M. De Bont, J. F. Nagelkerke, J. Van Steveninck and P. J. A. Van den Broek — 161 Photodynamic treatment of yeast with chloroaluminum-phthalocyanine: role of the monomeric form of the dye

Wei Yu, John O. Naim and Raymond J. Lanzafame — 167 The effect of laser irradiation on the release of bFGF from 3T3 fibroblasts

Miguel A. Miranda, Francisco Boscá, Franklin Vargas and Nieves Canudas — 171 Photosensitization by fenofibrate. II. *In vitro* phototoxicity of the major metabolites

Dimitris Skalkos, James A. Hampton, Rick W. Keck, Miriam Wagoner and Steven H. Selman — 175 Iminium salt benzochlorins: structure-activity relationship studies

Peter Neuner, Birgit Charvat, Robert Knobler, Reinhard Kirnbauer, Agatha Schwarz, Thomas A. Luger and Thomas Schwarz — 182 Cytokine release by peripheral blood mononuclear cells is affected by 8-methoxypsoralen plus UV-A

Taj Mohammad, Irwin Tessman, Harry Morrison, Matthew A. Kennedy and Stephen W. Simmonds — 189 Photosensitized inactivation of infectious DNA by urocanic acid, indoleacrylic acid and rhodium complexes

Vidyasagar Hejmadi, Clarke Stevenson, Shiv Kumar and R. Jeremy H. Davies 197 Alkali-labile photolesions mapping to purine sites in ultraviolet-irradiated DNA

Mary K. Blakefield and Denny O. Harris 204 Delay of cell differentiation in *Anabaena aequalis* caused by UV-B radiation and the role of photoreactivation and excision repair

Gy. Rontó, Gáspár, P. Gróf, A. Bérces and Z. Gugolya 209 Ultraviolet dosimetry in outdoor measurements based on bacteriophage T7 as a biosensor

Marc Purcell and Robert Carpentier 215 Homogeneous photobleaching of cholorophyll holochromes in a photosystem I reaction center complex

Stefan L. S. Kwa, Silvia Völker, Nina T. Tilly, Rienk van Grondelle and Jan P. Dekker 219 Polarized site-selection spectroscopy of chlorophyll *a* in detergent

Ei-ichi Nishizawa, Leenawaty Limantara, Noriyuki Nanjou, Hiroyoshi Nagae, Tomisaburo Kakuno and Yasushi Koyama 229 Solvent effects on triplet-state bacteriochlorophyll *a* as detected by transient Raman spectroscopy and the environment of bacteriochlorophyll *a* in the light-harvesting complex of *Rhodobacter sphaeroides* R26

Thomas Richter and Leonid Fukshansky 237 Authenic *in vivo* absorption spectra for chlorophyll in leaves as derived from *in situ* and *in vitro* measurements

Research Notes

Taj Mohammad and Harry Morrison 248 Light-mediated cyclization of (E)-3-(5-[6-hydroxy-7-methoxy]-benzofuranyl)propenoic acid, a water-soluble precursor of 8-methoxypsoralen

Gareth W. Griffith, Gareth I. Jenkins, E. James Milner-White and A. John Clutterbuck 252 Homology at the amino acid level between plant phytochromes and a regulator of asexual sporulation in *Emericella* (=*Aspergillus*) *nidulans*

Christian Kühnel-Kratz and Donat-P. Häder 257 Light reactions of the ciliate *Stentor coeruleus*—a three-dimensional analysis

PHOTOCHEMISTRY AND PHOTOBIOLOGY

VOLUME 59 ISSUE 3 MARCH 1994

Contents

Articles

C. Tanielian and R. Mechin 263 Reaction and quenching of singlet molecular oxygen with esters of polyunsaturated fatty acids

D. N. Nikogosyan, Yu. A. Repeyev, D. Yu. Yakovlev, V. I. Salyanov, S. G. Skuridin and Yu. M. Yevdokimov 269 Photochemical alterations in DNA revealed by DNA-based liquid crystals

Giorgia Miolo, Vittorio Lucchini, Paolo Rodighiero, Francesco Dall'Acqua and Sergio Caffieri 277 4′,5′-substituted methylangelicins: photocycloadducts with pyrimidine bases of DNA

Albert Michaeli and Jehuda Feitelson 284 Reactivity of singlet oxygen toward amino acids and peptides

Thomas A. Dahl, Piotr Bilski, Krzysztof J. Reszka and Colin F. Chignell 290 Photocytotoxicity of curcumin

Colin F. Chignell, Piotr Bilski, Krzysztof J. Reszka, Ann G. Motten, Robert H. Sik and Thomas A. Dahl 295 Spectral and photochemical properties of curcumin

Daniel H. Hug and John K. Hunter 303 Adventitious interconversion of *cis*- and *trans*-urocanic acid by laboratory light

David A. Russell, Roy H. Pottier and Dennis P. Valenzeno 309 Continuous, noninvasive measurement of *in vivo* pH in conscious mice

Norman E. Rosenthal, Charlotte Brown, Dan A. Oren, Giorgio Galetto, Paul J. Schwartz and James D. Malley 314 Effects of light on T-cells in HIV-infected subjects are not dependent on history of seasonal affective disorder

Fubao Lin and Albert W. Girotti 320 Cytoprotection against merocyanine 540-sensitized photoinactivation of the Na^+,K^+-adenosine triphosphatase in leukemia cells: glutathione and selenoperoxidase involvement

Béatrice Aveline, Tayyaba Hasan and Robert W. Redmond 328 Photophysical and photosensitizing properties of benzoporphyrin derivative monoacid ring A (BPD-MA)

Louis C. Penning, Karmi Tijssen, John VanSteveninck and Tom M. A. R. Dubbelman 336 Hematoporphyrin derivative-induced photodynamic inhibition of Na^+/K^+-ATPase in L929 fibroblasts, Chinese hamster ovary cells and T24 human bladder transitional carcinoma cells

Yoji Kato, Koji Uchida and Shunro Kawakishi 343 Aggregation of collagen exposed to UVA in the presence of riboflavin: a plausible role of tyrosine modification

Anna M. Richter, Ashok K. Jain, Modestus Obochi, Howard Meadows, Alice J. Canaan and Julia G. Levy 350 Activation of benzoporphyrin derivative in the circulation of mice without skin photosensitivity

Ruiting Lan, Gavin E. Greenoak and Chris Moran 356 Pyrimidine dimer induction and removal in the epidermis of hairless mice: inefficient repair in the genome overall and rapid repair in the H-*ras* sequence

Roberta Biolo, Giulio Jori, Marina Soncin, Riccardo Pratesi, Umberto Vanni, Boris Rihter, Malcom E. Kenney and Michael A. J. Rodgers 362 Photodynamic therapy of B16 pigmented melanoma with liposome-delivered Si(IV)-naphthalocyanine

Takeshi Takemura, Susumu Nakajima and Isao Sakata 366 Tumor-localizing fluorescent diagnostic agents without phototoxicity

Y. Gat and M. Sheves 371 The origin of the red-shifted absorption maximum of the M_{412} intermediate in the bacteriorhodopsin photocycle

Katayoon Dehesh, Chris Franci, Robert A. Sharrock, David E. Somers, Jo Anne Welsch and Peter H. Quail 379 The *Arabidopsis* phytochrome A gene has multiple transcription start sites and a promoter sequence motif homologous to the repressor element of monocot phytochrome A genes

Research Note

Sophia Kokotov, Aaron Lewis, Ronny Neumann and Shmuel Amrusi 385 X-ray induced visible luminescence of porphyrins

PHOTOCHEMISTRY AND PHOTOBIOLOGY

VOLUME 59 ISSUE 4 APRIL 1994

Contents

Articles

A. A. Gorman, I. Hamblett, V. S. Srinivasan and P. D. Wood 389 Curcumin-derived transients: a pulsed laser and pulse radiolysis study

K. Pitchumani and V. Ramamurthy 399 Formation of rearrangement product in photolysis of α,α-dimethyldeoxybenzoin upon cyclodextrin complexation

J. Blais, T. Douki, P. Vigny and J. Cadet — 402 Fluorescence quantum yield determination of pyrimidine (6-4) pyrimidone photoadducts

H. N. Ghosh, D. K. Palit, A. V. Sapre, K. V. S. Ramarao and J. P. Mittal — 405 Photophysical and photochemical properties of Triton X-165 in aqueous and methanolic solutions

J. C. Lima, Parvin Danesh, Paulo Figueiredo, Fernando S. Pina and António Maçanita — 412 Excited states of anthocyanins: the chalcone isomers of malvidin 3,5-diglucoside

G. N. Georgiou, M. T. Ahmet, A. Houlton, J. Silver and R. J. Cherry — 419 Measurement of the rate of uptake and subcellular localization of porphyrins in cells using fluorescence digital imaging microscopy

M. Dardalhon, L. A. Guillo, A. Moysan, P. Vigny and D. Averbeck — 423 Detection of pyrimidine dimers and monoadducts induced by 7-methylpyrido(3,4-c) psoralen and UVA in Chinese hamster V79 cells by enzymatic cleavage and high-pressure liquid chromatography

Sandra M. de Leeuw, Sacha Janssen, Johannes W. I. M. Simons, Paul H. M. Lohman, Bert-Jan Vermeer and Albert A. Schothorst — 430 The UV action spectra for the clone-forming ability of cultured human melanocytes and keratinocytes

Egil Kvam and Trond Stokke — 437 Sites of photodynamically induced DNA repair in human cells

David A. James, Dennis P. Arnold and Peter G. Parsons — 441 Potency and selective toxicity of tetra(hydroxyphenyl)- and tetrakis(dihydroxyphenyl) porphyrins in human melanoma cells, with and without exposure to red light

Paul Baas, Hugo Oppelaar, Martin A. van der Valk, Nico van Zandwijk and Fiona A. Stewart — 448 Partial protection of photodynamic-induced skin reactions in mice by *N*-acetylcysteine: a preclinical study

I. Alex Vitkin, Joshua Woolsey, Brian C. Wilson and R. Rox Anderson — 455 Optical and thermal characterization of natural (*Sepia officinalis*) melanin

Daniel J. Sexton, Arumugam Muruganandam, Donald J. McKenney and Bulent Mutus — 463 Visible light photochemical release of nitric oxide from *S*-nitrosoglutathione: potential photochemotherapeutic applications

Xiao-Yan He, Robert A. Sikes, Sharon Thomsen, Leland W. K. Chung and Steven L. Jacques — 468 Photodynamic therapy with photofrin II induces programmed cell death in carcinoma cell lines

A. R. Ellozy, R. H. Wang and J. Dillon — 474 Photolysis of intact young human, baboon and rhesus monkey lenses

Aziza R. Ellozy, Ren H. Wang and James Dillon — 479 Model studies on the photochemical production of lenticular fluorophores

Kenneth R. Hightower, Janet P. McCready and Doug Borchman — 485 Membrane damage in UV-irradiated lenses

Itamar Willner, Mazzi Lion-Dagan, Shai Rubin, Johann Wonner, Franz Effenberger and Peter Bäuerle — 491 Photoregulation of α-chymotrypsin activity in organic media: effects of bioimprinting

PHOTOCHEMISTRY AND PHOTOBIOLOGY

VOLUME 59 ISSUE 5 MAY 1994

Contents

Articles

Douglas E. Moore and Wei Zhou — 497 Photodegradation of sulfamethoxazole: a chemical system capable of monitoring seasonal changes in UVB intensity

Karen A. Marley and Richard A. Larson — 503 A new photoproduct from furocoumarin photolysis in dilute aqueous solution: 5-formyl-6-hydroxybenzofuran

Kathleen G. Specht — 506 The role of DNA damage in PM2 viral inactivation by methylene blue photosensitization

Jean M. Nussbaum, Mary Ellen A. Newport, Madelyn Mackie and Neocles B. Leontis — 515 Structure-specific binding and photosensitized cleavage of branched, DNA three-way junction complexes by cationic porphyrins

A. Andreoni, A. Colasanti, P. Colasanti, M. Mastrocinque, P. Riccio and G. Roberti — 529 Laser photosensitization of cells by hypericin

Käthe C. Noz, Len Roza, Wilma Bergman, Firouz Darroudi and Albert A. Schothorst — 534 UV induction of cyclobutane thymine dimers in the DNA of cultured melanocytes from foreskin, common melanocytic nevi and dysplastic nevi

Sasha Madronich and Frank R. de Gruijl — 541 Stratospheric ozone depletion between 1979 and 1992: implications for biologically active ultraviolet-B radiation and non-melanoma skin cancer incidence

David Kessel and Alan Morgan — 547 Photosensitization with a chlorin–thiobarbiturate conjugate

Meinhard Wlaschek, Gudrun Heinen, Arndt Poswig, Agatha Schwarz, Thomas Krieg and Karin Scharffetter-Kochanek — 550 UVA-induced autocrine stimulation of fibroblast-derived collagenase/MMP-1 by interrelated loops of interleukin-1 and interleukin-6

L. Uma, D. Balasubramanian and Yogendra Sharma — 557 *In situ* fluorescence spectroscopic studies on bovine cornea

Yun Zhu, R. W. Larsen and R. S. H. Liu — 562 FT-IR spectra of the Schiff bases and protonated Schiff bases of 7-*cis*- and 7,9-di*cis*-retinal

J. Bernarding, H.-J. Eckert, H. J. Eichler, A. Napiwotzki and G. Renger — 566 Kinetic studies on the stabilization of the primary radical pair $P680^+$ $Pheo^-$ in different photosystem II preparations from higher plants

B. Szalontai, Z. Gombos and M. Lutz — 574 Structural differences between phycocyanin and allophycocyanin from their resonance Raman spectra

V. Rosenbach-Belkin, A. Scherz, T. J. Michalski, M. Schiffer and J. Norris — 579 The effect of peripheral substitution on the bathochromic shift of the Q_y transition of bacteriochlorohyll dimers; *in vitro* models of the protein effect on the spectum of pigment centers in the light-harvesting complexes

PHOTOCHEMISTRY AND PHOTOBIOLOGY

VOLUME 59 ISSUE 6 JUNE 1994

Contents

Articles

J. C. Scaiano, Frances L. Cozens and Jack McLean — 585 Model for the rationalization of magnetic field effects *in vivo*. Application of the radical-pair mechanism to biological systems

L. Brancaleon, P. R. Crippa and C. Minari — 590 Time-resolved photoacoustic calorimetry of tryptophan in water and organic solvents

Aba Losi, Cristiano Viappiani and Pier Raimondo Crippa — 596 The interaction of melanin with 8-methoxypsoralen: effect on radiative and nonradiative transitions. A fluorescence and pulsed photoacoustic study

Yu Chu and Robert J. Hurtubise — 603 Comparison of the solid-matrix luminescence properties and photophysical parameters of two products from benzo(a)-pyrene–DNA adducts

Ivana Sirangelo, Gaetano Irace and Ettore Bismuto — 611 Resolution of the individual tryptophanyl contributions to the near-ultraviolet dichroic activity of apomyoglobin

Vladimir M. Mekler	615	A photochemical technique to enhance sensitivity of detection of fluorescence resonance energy transfer
David A. Musser and Allan R. Oseroff	621	The use of tetrazolium salts to determine sites of damage to the mitochondrial electron transport chain in intact cells following *in vitro* photodynamic therapy with photofrin II
Robert M. Roth, Yasuhiko Takamori and Ernst-Randolf Lochmann	627	Thiopyronine- and 8-methoxypsoralen-sensitized photodynamic effect on cell growth, colony forming ability and RNA synthesis in *Saccharomyces* mutants deficient in DNA repair
Thomas M. Brennan	631	Photosensitized inhibition of photosynthetic $^{14}CO_2$ fixation by α-terthienyl and ultraviolet-A
Edgar Arriaga, Andrey Frolov, Merrill Tarr and Dennis Paul Valenzeno	637	Membrane ionic current photomodification by rose bengal and menadione: role of singlet oxygen
Janusz Z. Beer, Kathleen M. Olvey, Wah Lee and Barbara Z. Zmudzka	643	Reassessment of the differential effects of ultraviolet and ionizing radiation on HIV promoter: the use of cell survival as the basis for comparisons
Shizuko Kobayashi, Yumiko Hirota, Junko Sayato-Suzuki, Makoto Takehana, Hisao Nishimura, Noriko Nishimura and Chiharu Tohyama	650	Possible role of metallothionein in the cellular defense mechanism against UVB irradiation in neonatal human skin fibroblasts
Mario Blumthaler, Walter Ambach, Roland Silbernagl and Johannes Staehelin	657	Erythemal UV-B irradiance (Robertson-Berger sunburn meter data) under ozone deficiencies in winter/spring 1993
Yoshitaka Beppu and Toshiaki Kakitani	660	Theoretical study of color control mechanism in retinal proteins. I. Role of the tryptophan residue, tyrosine residue and water molecule
Shmuel Malkin and Arnold J. Hoff	670	Acoustic detection of triplet states formed by radical pair recombination in quinone-depleted photosynthetic reaction centers, by magnetic field modulation (magnetophotoacoustic effect)—a feasibility study
Mariza Pires de Melo and Giuseppe Cilento	677	Chemiexcitation in the peroxidative metabolism of *N*-methylcarbazole: mechanistic implications
Volume 59 Contents	i	
Volume 59 Author Index	x	
Volume 59 Subject Index	xiii	